

REPORT OF THE FOREST INSECT CONTROL PROJECT AND  
SURVEY OF THE MISSOULA AND BITTERROOT NATIONAL FORESTS.

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Forest Insect Field Station,  
Coeur d'Alene, Idaho,  
October 30, 1924.

J.B.Y.  
J.B.J.

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INTRODUCTION

Reference is made to the memorandum to the District Forester, submitted from this station under date of May 14, 1924. In accordance with the plan as formulated by Mr. J. C. Evenden, Entomologist of this station and the District Forester, a survey of the Georgetown Lake area was started by the writer in company with Mr. H. Bauer on the 13th, of May 1924. From previous reports it was thought that the principal area of infestation was confined to T. 5 N. R. 14 W. but on examination of the extensive lodgepole pine stands on the East Fork of Rock Creek and Meadow Creek, being guided by the scattered groups of redtopped ( 1922 killed ) trees it was found that the mountain pine beetle was causing a heavy loss in this valuable body of timber, and all available time was spent in cruising and marking infested trees in this area. Control work was started on May 22, 1924 and continued until June 18, 1924, at which time the broods were beginning to transform from pupae to new adults and the work was no longer considered advisable. The extensive survey of all the Missoula National Forest south of the line of defense

and portion of the Bitterroot and Beaverhead National Forests as recommended in the plan referred to, was started by the writer in company with Mr. H. Bauer on July 22, 1924 and completed on September 5, 1924.

### CONTROL OPERATIONS.

#### Method of control.

Control work started on May 22, 1924, with a crew consisting of a foreman, cook and four axemen. Owing to the scattered condition of the infestation a camp was established at the most suitable location, the crew riding to and from work in a light wagon, on their own time. In addition to the sharp doublebitted axes two of the heavy bark peeling spuds that were used on the Helena control project in 1923 were secured but were discarded for some of a lighter make consisting of a piece of heavy saw blade about 5 by 7 inches, sharpened on one edge and rivetted to a flattened hoe blade with handle intact. Long handles were fastened to some of the blades for reaching high up on bole. These spuds were obtained at a stull camp near the control operations. The axes were required to remove the infested bark from trees which had dried out considerable while the spuds were used to good advantage on trees with moist bark. The largest group of infested trees numbering 220 were located on Sec. 17, T. 5 N., R. 14 W. At the time of control it was found that these trees were included in a stull

cutting area and an agreement was made with the operators whereby the control crew would cut, limb and buck the infested trees into the required lengths and the stull cutters would follow up and peel all the infested logs. This agreement was carried out to the satisfaction of all parties concerned and as many of the infested trees were large and heavy limbed a considerable saving in time and money resulted from this co-operation. After completing the Georgetown area the control camp was moved to the Shilling ranch on Meadow Creek and the East Fork of Rock Cr. and Meadow Creek areas worked from this camp. After the first of June the foliage on the infested trees began to show a discoloration and additional trees were located and marked increasing the total to 1010 to be treated, which were situated on 22 different sections. By the 6th, of June all the larger groups of trees had been treated and the crew then reduced to the foreman and two axemen equipped with saddle and pack horses. This crew continued treating scattered trees until the 18th, of June at which time the broods were transforming to new adults and the work was discontinued.

Cost of control.

Foreman -----	\$5.00	per day.
Cook -----	3.00	" "
2 axemen @ \$2.50 each -----	5.00	" "
2 axemen @ \$3.00 each -----	6.00	" "
Hire of team and wagon -----	1.00	" "
Total	\$20.00	" "



The sum of \$870.00 was allotted for the cruising and control work of which \$867.13 was expended leaving a balance of \$2.87.

The cost per tree, distributed as follows;

Labor *-----	\$ .52
Subsistance-----	.114
Travel-----	.155
Equipment, horse feed etc. ----	.068
Total	<u>\$ .857 Per tree.</u>

Total number of sections cruised ** -----	22
Total number of trees treated-----	1010
Total number of trees cut and peeled-----	240
Total number of trees peeled standing-----	770
Total volume of board feet treated-----	121.200
Average diameter D.B.H. -----	13 inches.
Average volume board feet per tree-----	120
Average height peeled -----	9 feet.
Cost per tree treated-----	\$ .85
Cost per tree for labor only-----	\$ .52
Cost per M. B. F. for labor only-----	\$4.34
Cost per acre for cruising and control-----	\$ .06

( \*) The writers salary not included in this item.

( \*\* ) Reference is made to the appended maps showing location of sections cruised and trees treated.

## EXTENSIVE SURVEY.

### Method and cost of survey.

A large portion of the Rock Creek drainage being accessible by roads it was planned to drive as far as practicable with a light wagon and work from temporary camps on horseback. This plan worked well until the fifth day out, when in driving over a very rough road the front axle was broken, the wagon was then abandoned and the remainder of the survey made with saddle and pack horses. Horseback trips were made up all the main forks and feeders of Rock Creek below the line of defense and the drainage was also viewed from all available ridges and peaks. Repetition of travel was avoided as much as possible.

Estimated mileage travelled, by wagon 102 miles, horseback 573 miles, on foot 20 miles, making a total of 695 miles in 44 days with an average of 15.8 miles per day. Cost of the survey not including the writers salary \$437.17. Approximate estimate of the area examined 43,500 acres at a cost of \$.01 per acre. Reference is made to the appended map showing route travelled, extent of the lodgepole pine stands infested with the mountain pine beetle and the relative degrees of the infestation.

Missoula National Forest.

Lodgepole pine.

All of the lodgepole pine stands south of the line of defense, affording suitable host material were examined and it was found that the area infested and the loss caused by the mountain pine beetle was far more extensive than was supposed. Judging from the condition of the insect killed trees along Copper Creek between Moose Lake and Frog Pond Basin the infestation in this area apparently dates back 6 or 8 years and may have been started by beetles crossing over from the East Fork of the Bitterroot. At the time of the survey the foliage on the 1923 killed trees was turning red and served as a guide for locating the extent of the infestation and the 1924 attacked trees which were invariably found near. On examination of the areas where control work had been done during May and June 1924 it was found that on an average the new attack ( 1924 ) would equal the number of the trees treated with the exception of two areas where an increase of 100% was noted. Some of the trees that had been peeled standing were felled and the tops examined, these trees had dried out to such an extent that but a very light emergence was recorded. The main swarm of beetles capable of killing so many new trees no doubt coming from the original source beyond the line of defense. On the stull cutting on Section 17, where all the 1923 infested trees had been cut and peeled the beetles were found attacking the large yellow pine logs that had been recently cut and left to dry out before skidding, and also the freshly cut stulls. A few of the remaining green trees were also attacked where the stull cutting was still in progress.



Alpine fir.

An infestation in the Alpine fir caused by a small bark beetle ( Dryocoetes sp. ) was noted at the heads of all the larger streams along the route travelled and was found to be most severe in the vicinity of Mud Lake and along the divide between the Bitterroot and Missoula National Forests.

Bitterroot National Forest.

Reference is made to the memorandum under date of August 20, 1921, submitted from this station by Mr. J. C. Evenden, to the Forest Supervisor of the Bitterroot National Forest. This memorandum states that a very severe infestation had occurred in the lodgepole pine stand on the East Fork of the Bitterroot River drainage prior to 1921 but at the time of the examination, was in a normal stage. It was recommended that a yearly examination be made of this area and in event of a recurring epidemic, control measures be adopted. No further reports being received at this station on the condition of this infestation it was deemed advisable to examine this area in conjunction with the Missoula National Forest survey. The writer in company with Mr. Bauer crossed over to the Bitterroot from Frog Pond Basin on the Missoula National Forest on August 20, 1924. On reaching the open ridge on the divide at the head of Moose Cr.

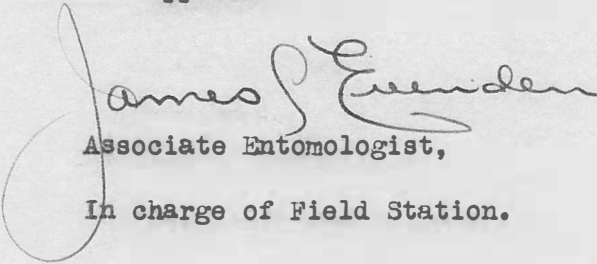
an extensive view of the East Fork drainage was obtained and an area several miles in extent which appeared to be a solid mass of redtopped trees was seen in the distance. In passing down the trail along Moose Creek the severity of the 1924 attack was apparent, as large groups of newly attacked trees were noted along the entire distance travelled. Judging from the number of redtopped trees on the canyon sides the 1923 attack was confined mostly to the higher elevations but the 1924 attack appeared to be centered in the remaining green timber along the creek bottom. This same condition was also found on Marten Creek. An examination was made of a part of the heavy infested lodgepole pine stand on Sections 20, 21 and 28, T. 2 N., R. 17 W., this being the area mentioned as seen from the Moose Creek ridge on August 20th. Judging from the condition of the insect killed trees, the infestation in this stand had apparently started to increase in 1921 reaching an epidemic stage in 1923 and in portion examined hardly a green lodgepole pine over 10 inches D.B.H. will survive the 1924 attack. The mountain pine beetle is also becoming well established in the yellow pine on this drainage as groups of 10 to 20, and individual 1923 killed trees were seen on all the ridges supporting a yellow pine stand and a number of 1924 attacked trees were examined.

Big Hole Drain

Big Hole Basin.

The return trip from the Bitterroot National Forest was made by way of the Big Hole Basin, crossing over from the East Fork to Mussigbrod Lake by way of the Buck Lake and Roaring Creek trails. From Mussigbrod Lake the route travelled embraced the principal stand of lodgepole pine on the northwest side of the basin. An examination was made of a number of the areas where the extensive control operations were conducted in 1912 and 1913. It was found that the method of treating all or a large per cent of the infested trees over the entire area of infestation had been very effective for a number of years. However in the past two years a light infestation has started in the vicinity of these areas and small groups of 1924 attacked trees were noted as shown on the appended map.

Approved

  
Associate Entomologist,

In charge of Field Station.

Respectfully submitted

  
Senior Scientific Aid.

## RECOMMENDATIONS.<sup>a</sup>

Reference is made to past correspondence on this project, especially the District Foresters' letter to The Forester of March 21st, 1924, and the writers letter to the District Forester under date of March 29th, 1924.

At the time this project was instituted it was done so on the premise that there were but two small areas of infestation, near Georgetown Lake, which were behind the proposed line of defense. The data secured during the past summers reconnaissance and presented by Mr. Rust in this report, places this project in an entirely different light. This report shows that the losses in the protected area, or that region to the south of the line of defense, were a great deal heavier and extensive than had been previously reported. Further more this loss has been occurring for the past two or three years. Mr. Rust states that there are at least 12,000 trees in the Missoula National Forest, south of this line, which were attacked in 1924. Inasmuch as the foliage of infested trees do not begin to discolor until the season after the attack, data referring to the current years loss is always difficult to obtain.

The amount of the 1924 infestation in the Missoula National Forest is not a startling or discouraging fact. This condition was expected and was discussed in the Memorandum to the District Forester submitted from this station on May 14th, 1924. The main body of the Blackfoot

<sup>a</sup> This section prepared by James C. Evenden, Associate Entomologist, in Charge of the Forest Insect Field Station, Coeur d'Alene, Idaho.

River infestation which has been sweeping south along the west side of the Continental Divide for the past ten years, now lies in the timber stands to the north of the defense line, the heaviest center being in the Boulder Creek drainage a few miles to the northeast of Philipsburg, Montana. It was expected that from these thousands of infested trees there would be a recurrence of the 1923 attack. Under the method of control which was outlined for this project and which called for the fighting of invaders as they crossed a given point or line, it was realized that this work would necessarily continue as long as the main body of the infestation in front of this line remained strong enough to send attacking forces forward.

However the situation which is startling and which places this project in a different light, is that condition which exists on the East Fork of the Bitterroot River. This area was feared, but as time was not available for an examination this spring, and as no data subsequent to the writers report of May, 1921 was available, it was assumed that the infestation was still in an endemic status. Mr. Rust places the number of 1924 attacked trees at no less than 150,000. As this area lies behind the line of defense it must be considered in all future plans of control.

The source of this extremely heavy infestation is very questionable. It could have been caused by a heavy flight of beetles from the infested areas to the northeast, or it could be a recurrence of the previous outbreak which occurred in this region at about the same time as the Big Hole



Basin in 1913. The writer is inclined to feel that the later theory is perhaps the soundest.

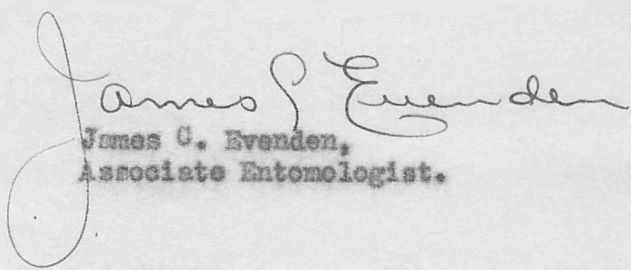
The thoughts of future control now seem prohibitive. Based upon the cost of last springs control work ( \$0.85 per tree ) it is safe to assume, that due to the scattered type of infestation throughout the Missoula National Forest and the topography of the country to be covered, that it would cost at least \$1.00 per tree in this forest. In the Bitterroot National Forest where the infested trees lie for the most part in solid blocks, the cost per tree would no doubt be less than the spring work. However it would be safe to assume that the cost of treating all of the infested trees south, or behind the line of defense, would be from \$125,000 to \$150,000. To treat the infestation of the Missoula Forest without including the Bitterroot Forest would be time and money wasted. These two forests are so closely linked together, that the source of some of the new infestation on the Missoula may be from the Bitterroot.

In view of the above facts the writer fails to see the least chance of any economical success in the future continuation of this project. It must be understood that this decision is reached, not because of the conditions within the Missoula Forest, but because of the conditions which exists on the headwaters of the Bitterroot River. It will be noted from the map accompanying this report that as yet there is but very little new infestation in the Big Hole Basin. To move the line of defense further south along the Continental Divide, in an attempt to save the timber stands

within the Big Hole Basin is not believed to be feasible. The cost of such a project would be very high if the infestation crosses the Continental Divide, and if it does not then there would perhaps be no need for control. Furthermore but little protection would be given to the region in question, as the operation would not stop the infestation from coming into the timber stands, so there would be nearly as much loss with, as without control measures.

Though it is regretted very sincerely that the results of the past summers insect survey revealed such startling information, it is believed by the writer that no further good can be accomplished by the continuation of this project. Therefore it is recommended, and in doing so it is realized that a large percent of the remaining stands of lodgepole pine in this region will be destroyed, that this project be discontinued.

Respectfully submitted,

  
James C. Evenden,  
Associate Entomologist.



UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
MAP SHEET

No.

Missoula

National Forest.

Division

District

Block

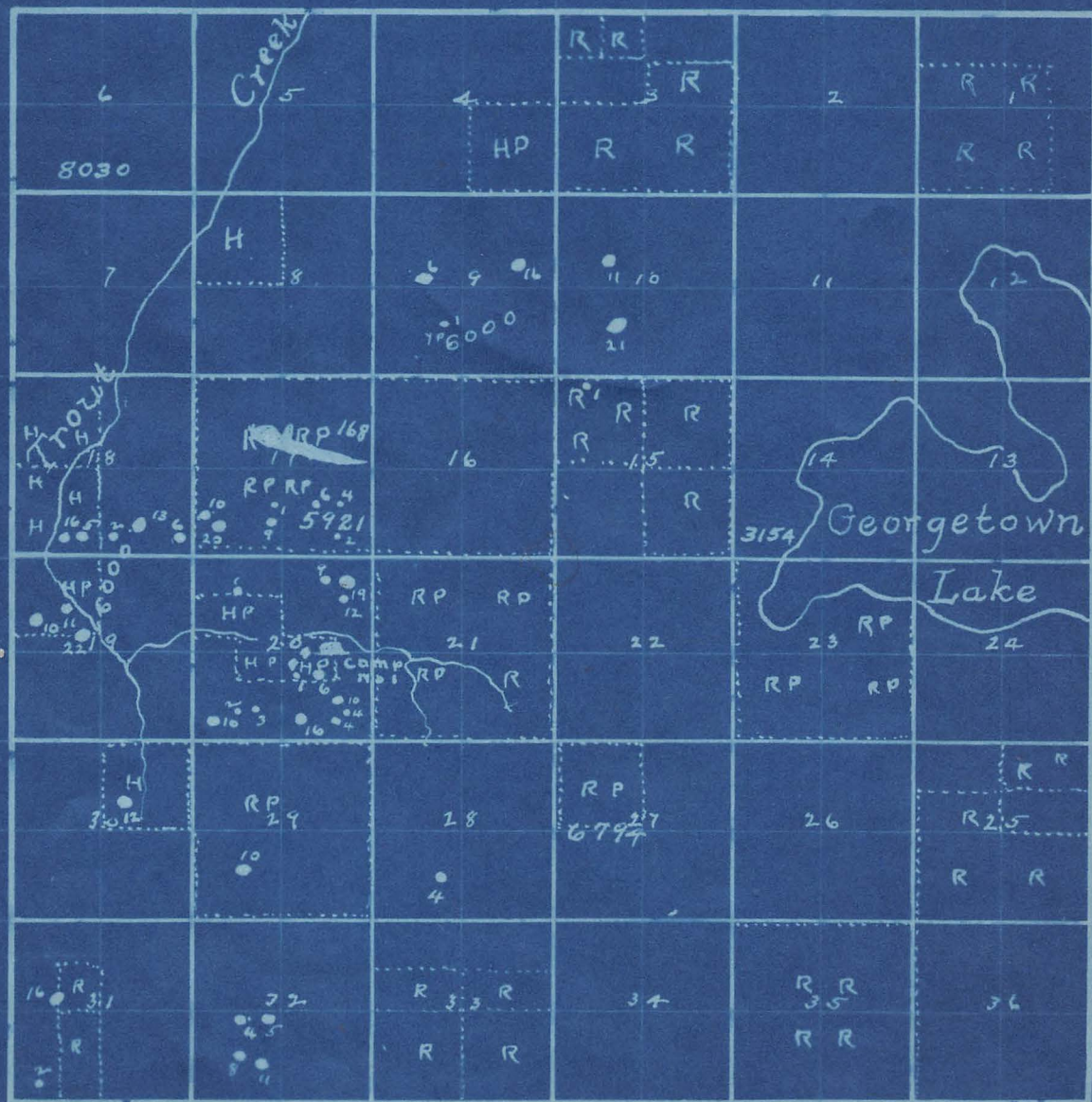
T. 5 N., R. 14 W.

M., Section

Quarter

Mapped by H.J. Rost &amp; H. Bauer.

Scale: 1 inch = 1 mile.



• 532 Lodgepole Pine Treated

Sec. 9 - 23 Sec. 18 - 42 Sec. 29 - 10  
Sec. 10 - 32 Sec. 19 - 43 Sec. 30 - 12  
Sec. 15 - 01 Sec. 20 - 99 Sec. 31 - 18  
Sec. 17 - 220 Sec. 28 - 04 Sec. 32 - 28



UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
MAP SHEET

No.

Missoula

National Forest.

Division

District

Block

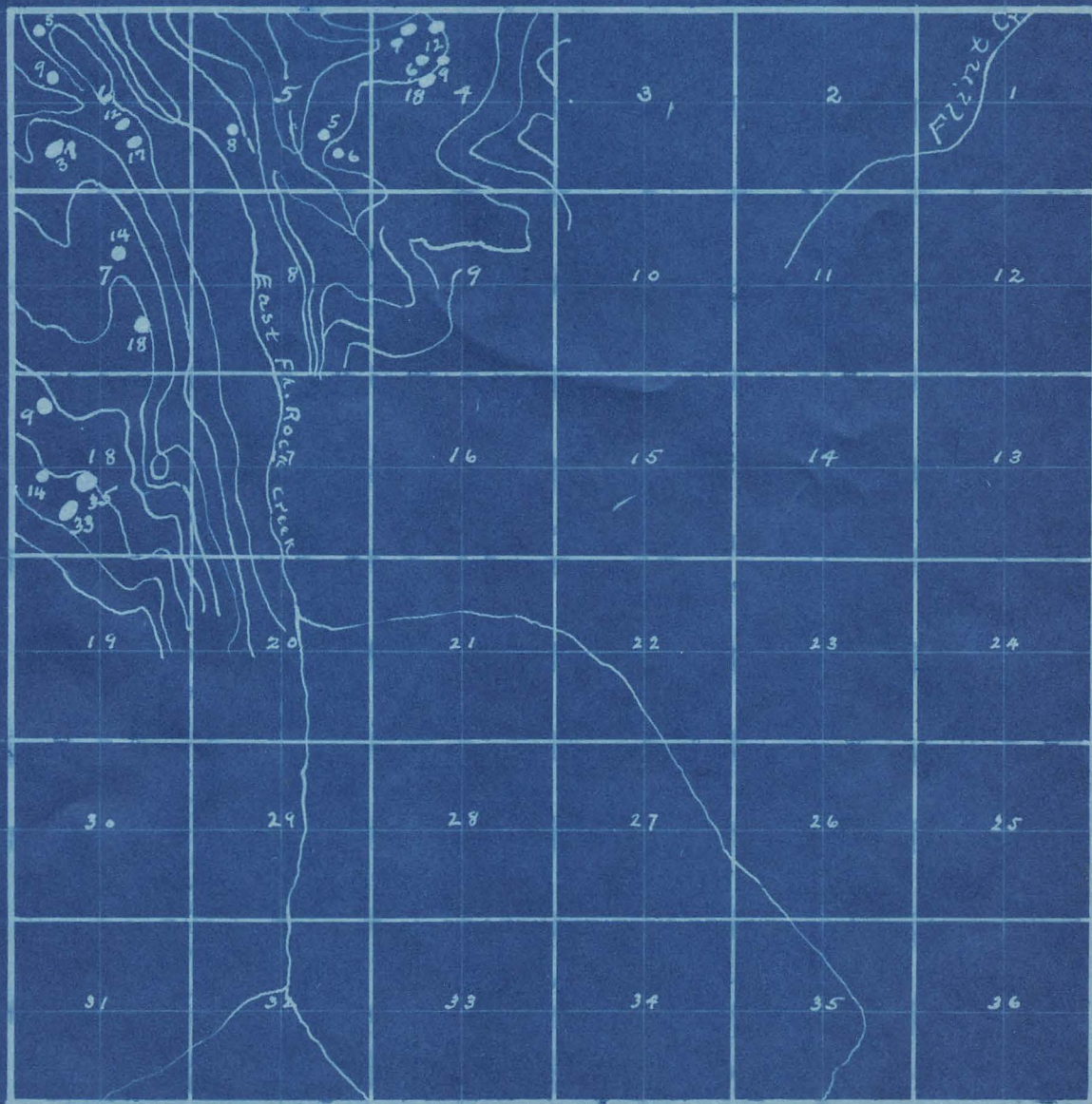
T. 4 N. R. 14 W.

M. Section

Quarter

Mapped by H.J. Rust &amp; H. Bauer.

Scale: 1 inch = 1 mile.



● 276 Lodgepole Pine Treated

Sec. 4 .54

Sec. 5 .19 Sec. 18 .91

Sec. 6 .80

Sec. 7 .32



UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
MAP SHEET

No. \_\_\_\_\_

Missoula National Forest.

Division \_\_\_\_\_

District \_\_\_\_\_

Block \_\_\_\_\_

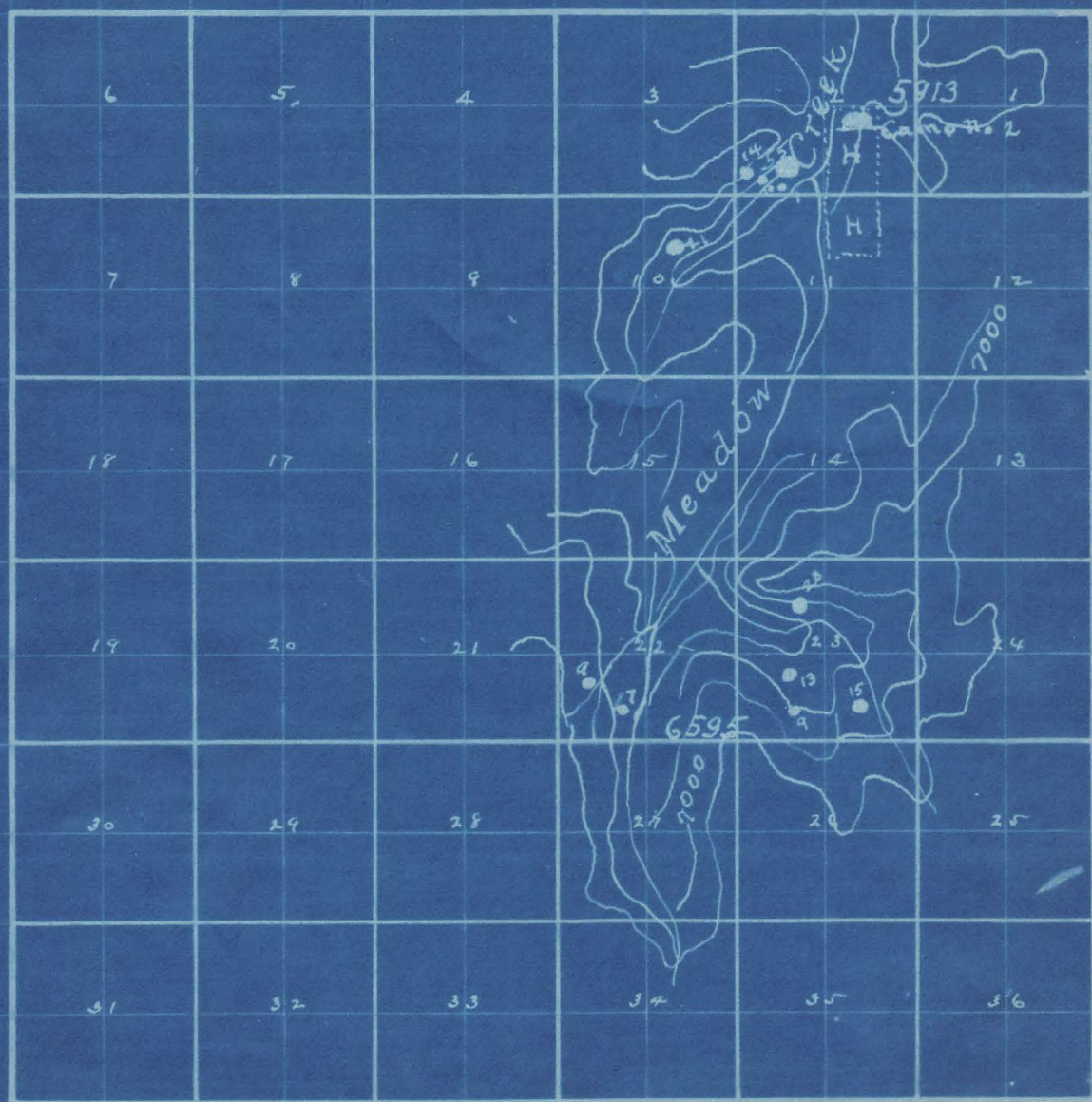
T. 4 N , R. 15 W.,

M., Section \_\_\_\_\_

Quarter \_\_\_\_\_

Mapped by H.J. Rust &amp; H. Bauer.

Scale: 1 inch = 1 mile.



• 177 Lodgepole Pine Treated.

Sec. 2 • 80

Sec. 10 • 21

Sec. 22 • 16

Sec. 23 • 60



UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
MAP SHEET

No.

Missoula

National Forest.

Division

District

Block

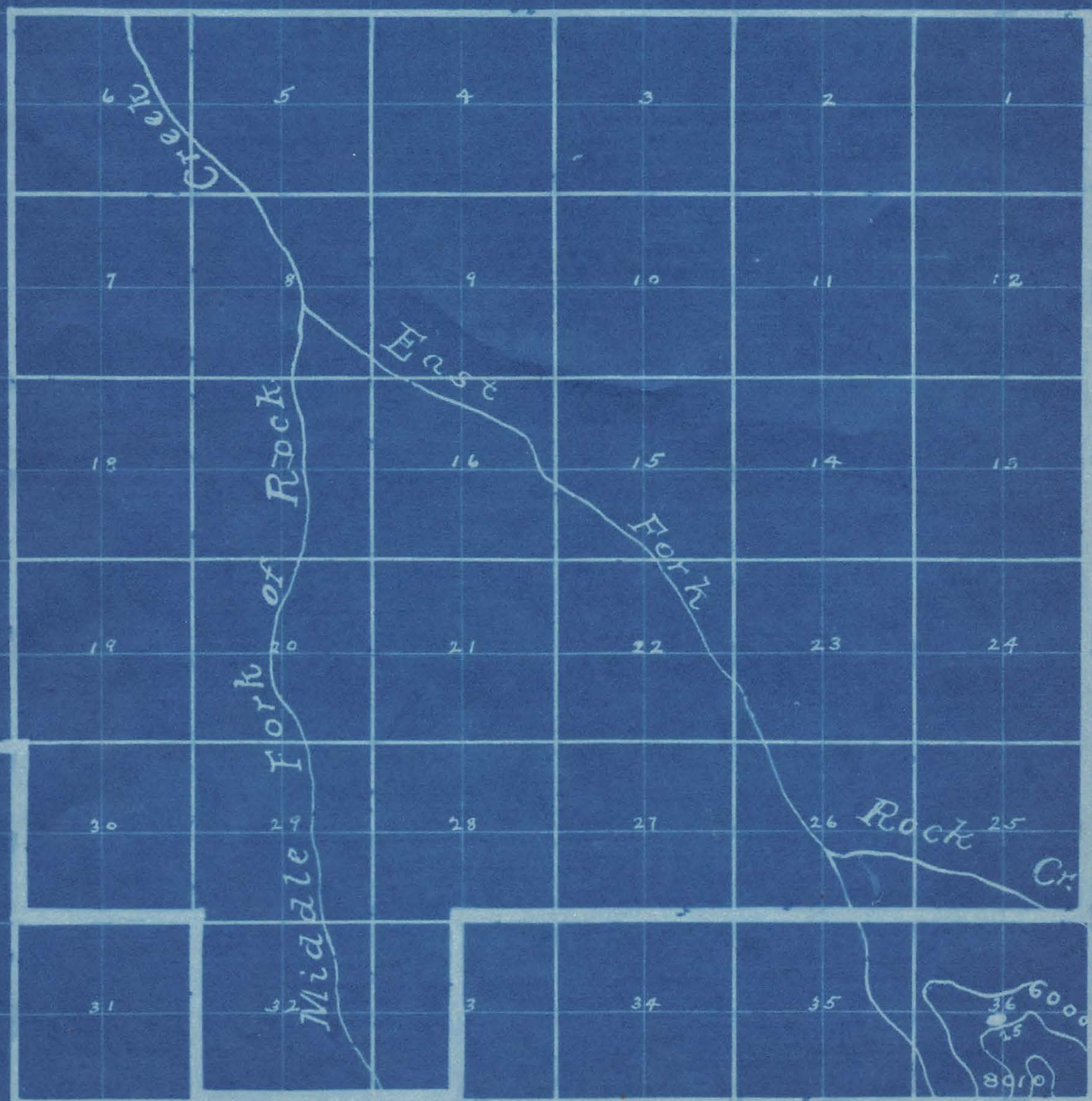
T. 5 N., R. 15 W.

M., Section

Quarter

Mapped by H.J. Rust &amp; H. Bauer

Scale: 1 inches = 1 mile.



• 25 Lodgepole Pine Treated

Sec. 36 • 25



View of part of Sec.17  
T. 5 N., R. 14 W.  
Stall cutting area at  
the extreme right and  
left in lodgepole pine.

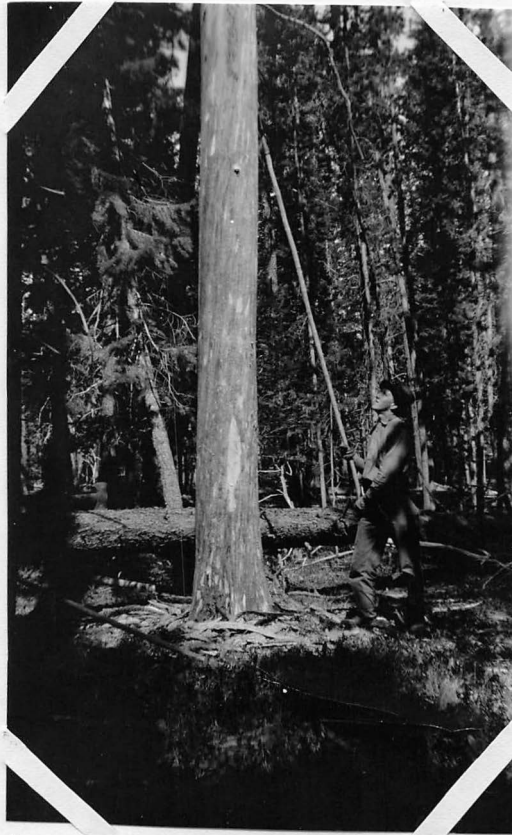
Infested logs peeled  
by stall cutters, lying  
among stulls.



Infested logs peeled  
by stall cutters on  
Section 17.

H.J.Rust





The long-handled spud  
used in peeling infested  
lodgepole pine, standing.



Control crew felling, limbing and bucking infested  
lodgepole pine.

H.J. Rust



View of mountain  
pine beetle infestation  
in lodgepole pine on  
the East Fork of the  
Bitterroot River.

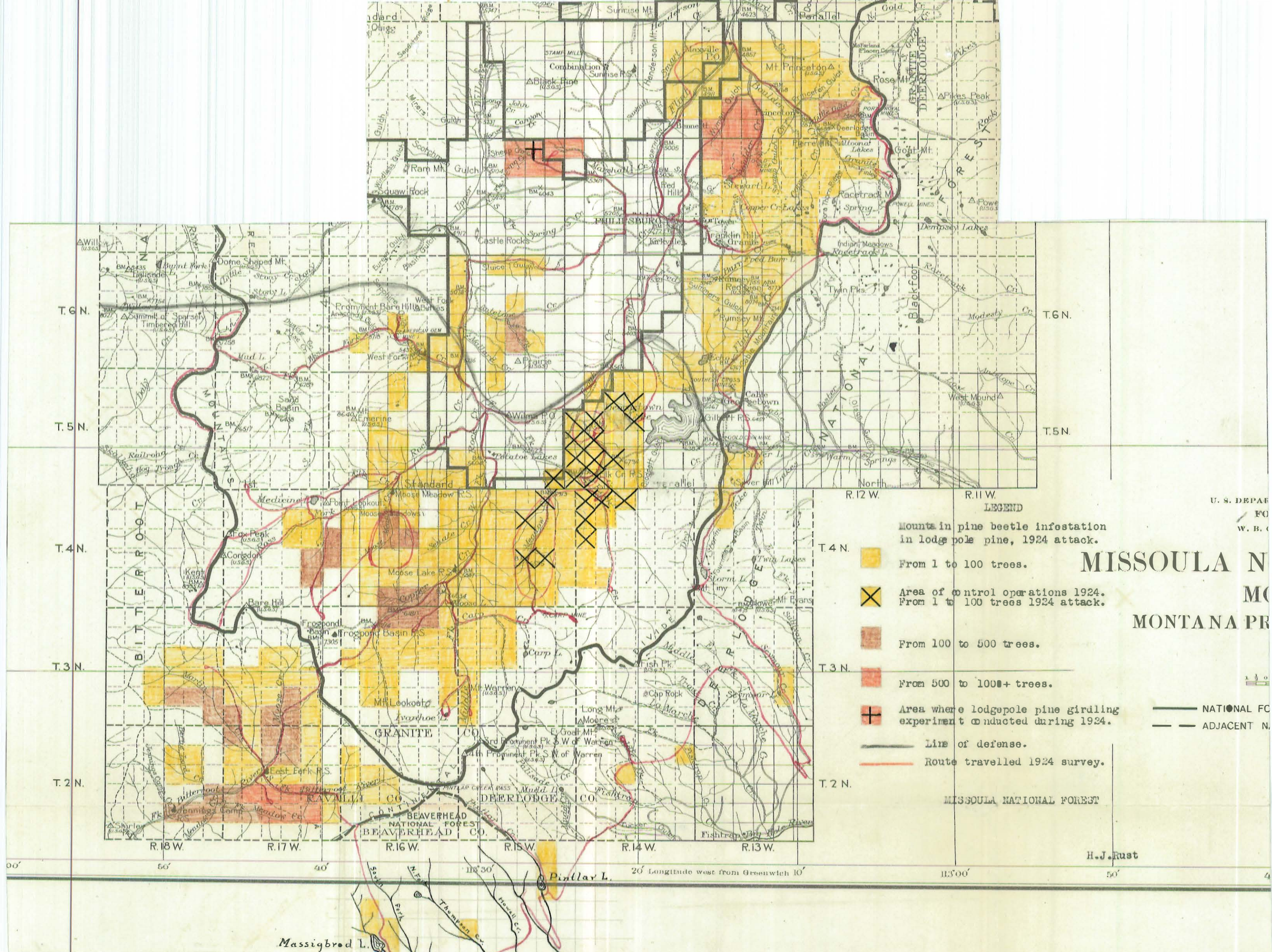
Redtopped ( 1923 ) killed  
trees show light col-  
ored in photograph.

Distant view of the  
heavy infestation on  
the East Fork of the  
Bitterroot River.

Redtopped ( 1923 )  
killed trees show light  
colored in photograph.







U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
W. B. C.

# MISSOULA NATIONAL FOREST MONTANA PR

- LEGEND**
- Mounts in pine beetle infestation in lodgepole pine, 1924 attack.
  - From 1 to 100 trees.
  - Area of control operations 1924. From 1 to 100 trees 1924 attack.
  - From 100 to 500 trees.
  - From 500 to 1000+ trees.
  - Area where lodgepole pine girdling experiment conducted during 1924.
  - Line of defense.
  - Route travelled 1924 survey.

MISSOULA NATIONAL FOREST

H.J. Rust

00' 50' 40' 30' 20' Longitude west from Greenwich 10' 11500' 50' 4